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RAM 352, including an operating system 370, one or more application programs 372, other program modules 374, and program data 376. Operating system 370 is a componentized operating system as discussed above (e.g., operating system 102 of FIG. 1). A user may enter commands and information into computer 342 through input devices such as keyboard 378 and pointing device 380. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices are connected to the processing unit 344 through an interface 368 (e.g., a serial port interface) that is coupled to the system bus. A monitor 384 or other type of display device is also connected to the system bus 348 via an interface, such as a video adapter 386. In addition to the monitor, personal computers typically include other peripheral output devices (not shown) such as speakers and printers.

Computer 342 can operate in a networked environment using logical connections to one or more remote computers, such as a remote computer 388. The remote computer 388 may be another personal computer, a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to computer 342, although only a memory storage device 390 has been illustrated in FIG. 9. The logical connections depicted in FIG. 9 include a local area network (LAN) 392 and a wide area network (WAN) 394. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets, and the Internet. In the described embodiment of the invention, remote computer 388 executes an Internet Web browser program such as the "Internet Explorer" Web browser manufactured and distributed by Microsoft Corporation of Redmond, Wash.

When used in a LAN networking environment, computer 342 is connected to the local network 392 through a network interface or adapter 396. When used in a WAN networking environment, computer 342 typically includes a modem 398 or other means for establishing communications over the wide area network 394, such as the Internet. The modem 398, which may be internal or external, is connected to the system bus 348 via a serial port interface 368. In a networked environment, program modules depicted relative to the personal computer 342, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

Generally, the data processors of computer 342 are programmed by means of instructions stored at different times in the various computer-readable storage media of the computer. Programs and operating systems are typically distributed, for example, on floppy disks or CD-ROMs. From there, they are installed or loaded into the secondary memory of a computer. At execution, they are loaded at least partially into the computer's primary electronic memory. The invention described herein includes these and other various types of computer-readable storage media when such media contain instructions or programs for implementing the steps described below in conjunction with a microprocessor or other data processor. The invention also includes the computer itself when programmed according to the methods and techniques described above. Furthermore, certain sub-components of the computer may be programmed to perform the functions and acts described above. The invention includes such sub-components when they are programmed as described. In addition, the invention

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described herein includes data structures, described above, as embodied on various types of memory media.

For purposes of illustration, programs and other executable program components such as the operating system are illustrated herein as discrete blocks, although it is recognized that such programs and components reside at various times in different storage components of the computer, and are executed by the data processor(s) of the computer.

## CONCLUSION

Thus, a componentized operating system has been described. The operating system is made up of multiple components that are identified (either explicitly or implicitly) by a bill of materials. This advantageously provides an easy mechanism to identify what components are to be installed for an operating system and/or which components are already installed as an operating system. Additionally, the operating system can be readily updated by simply replacing current components.

Although the description above uses language that is specific to structural features and/or methodological acts, it is to be understood that the invention defined in the appended claims is not limited to the specific features or acts described. Rather, the specific features and acts are disclosed as exemplary forms of implementing the invention.

The invention claimed is:

1. One or more computer-readable media having stored thereon a computer program that installs an operating system on a computer, wherein the computer program includes computer readable instructions that, when executed by one or more processors of the computer, causes the one or more processors to perform acts including:

accessing a bill of materials (BOM) to identify a first set of operating system components;

accessing a higher-level manifest corresponding to an individual component of the first set of components, the higher-level manifest including a sub-component list of any sub-components upon which the individual component depends, a priority order for the individual component relative to other components, and a version indicator for the individual component;

accessing a lower-level manifest of an individual sub-component, the lower-level manifest including a sub-component list of any hierarchical components upon which the individual sub-component depends, a priority order for the individual sub-component relative to other components, and a version indicator for the individual sub-component;

updating the higher-level manifest consistent with the sub-component priority order and version indicator in an instance where information of the higher-level manifest is outdated relative to the lower-level manifest;

updating the BOM based upon the higher-level updated manifest in an instance where information of the BOM is outdated relative to the higher-level manifest; and, generating an operating system image based upon the BOM, the higher-level manifest and the lower-level manifest.

2. One or more computer-readable media as recited in claim 1, wherein the accessing a higher-level manifest and accessing a lower-level manifest enable managing individual hierarchical sub-components at a relatively fine level of granularity rather than managing individual components at a coarser level of granularity, effective to allow individual sub-components to be dynamically upgraded.